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THE RECENT BIRD TRACKS OF THE BASIN OF MINAS.

BY C. FRED. HARTT, A. M.

Almost in the very heart of Nova Scotia is the Basin of Minas, a beautiful sheet of water communicating with the head of the Bay of Fundy by a narrow strait. It is triangular in shape, the longer, or northern shore being about sixty miles in length, running nearly east and west, skirting the Cobequid hills. The western or shortest side runs about north and south, along the edge of the fertile New-Red Sandstone district of Cornwallis, known as the "Garden of Nova Scotia," or "Corn-and-potatoes-wallis." At the southern angle of the triangle enter two rivers, or, more properly, estuaries; the Cornwallis, which comes from the west, and the Avon, which enters from the south-east. Between the mouth of these two rivers is the Grand Pré, the home of Evangeline, rendered celebrated by the delightful poem of Longfellow.

The scenery of this part of Nova Scotia is very picturesque and beautiful. Almost at the mouth of the Cornwallis is the pretty little village of Wolfville, the seat of Acadia College. From the cupola of that Institution we

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look over nearly the whole Basin and the surrounding country. In front of us is the Basin; to the left, somewhat, Cornwallis, with its low, undulating lands dotted with farms and farm-houses, and beyond, the North mountains that border the whole southern shore of the Bay of Fundy like a wall, breaking down abruptly on the western shore of the Basin of Minas, forming a noble promontory, Cape Blomidon, whose bright red sandstone cliffs and frowning trap-crags are not less grand than the Palisades of the Hudson. We see the high ridge of the Cobequids stretching along the northern shore eastward as far as the eye can reach, while just east of the Avon are the Carboniferous hills of Cheverie, and on our right and almost at our very feet is the Grand Pré.

At Halifax, and along the Atlantic shore of Nova Scotia, the tide rises but a few feet; but, as every one knows, the rise at the head of the Bay of Fundy amounts sometimes to seventy feet.

Arriving at Halifax by steamer, we take the cars to Windsor, a little town on the Avon, a few miles above its mouth, whence a small steamer plies to St. John, New Brunswick. We arrive two or three hours before the steamer is expected in. There is a crowd on the wharf, and we go down to see what is the matter, but to our astonishment we see a wide, deep valley, like a great mud ditch, and no water, except a narrow stream, excessively turbid, which meanders over the expanse of soft chocolate-colored mud and sand at the bottom. At the foot of the wharf, which is some twenty or more feet high, a bank of soft mud, scored with trough-like depressions made by the keels of vessels, slopes off ten feet further to the bed of the river. Vessels lie high and dry at the wharves, and—Where is the water?

Below Windsor, one looks down the river some distance, and then the view is shut off by an eastward bend. By and by we see something white making its appearance at this point. It is advancing up the stream, and there is a gleam of water behind it. Some one who has also been on the lookout exclaims, "Here comes the tide!" We see it coming steadily up the channels, with a line of foam* along its front. It rushes swiftly by us, passes under the long bridge that spans the Avon just above the town, and is out of sight. Meanwhile the whole bottom of the depression is flooded, and the water is pouring in like a river. It creeps visibly up the edges of the mud banks, gains the bases of the piers, and sweeps out higher and yet higher the sun-dried, muddy fronds of the coarse, knotty-leaved fuci, that hang heavily from the pier. As we watch the flood eddying and rippling along the sides of the wharves, gaining steadily and visibly in height every moment, we can scarcely repress the question, Where will it stop? But a little while ago we looked down the river and saw it as a great empty mud ditch. Now it is a broad expanse of water, that would be beautiful, were it not that its waves are excessively turbid, and of a coffee, or rather chocolate, color, contrasting strangely with the green meadows and cultivated hillsides that border it. There is a little fleet of vessels too, that is being borne in on the current, and presently some one cries out, "Here she comes!" There is a long black line of smoke issuing from beyond the elms on the point, and in a moment the little bay steamer makes her appearance, and is soon blowing off steam alongside of the pier. Meanwhile the tide has risen so as nearly to fill the channel. An hour afterwards, when the boat leaves, the marsh meadows are overflowed, and all the bordering flat lands would be deluged, were they not protected from the flood by a line of embankments, called "dykes." Away goes the steamer with the turn of the tide, a few little vessels drop down on its current, and five hours afterwards little boys wade across in the mud above the bridge to avoid paying the toll.

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* The shape of the estuary of the Peticodiac, in New Brunswick, is such as to cause the formation of a "bore," or high wave, that sweeps violently up the channel in its narrow part in advance of the tide.

The northern and southern shores of the Basin of Minas are bordered by bluffs of Lower Carboniferous sandstone and shale, and soft, bright-red beds of clayey sandstone belonging to the "New-Red" or Trias formation of geologists. The western shore is wholly composed of this latter rock.

One would expect that the action of tidal currents, such as we have described, combined with the amount of surface exposed to wave-action, between high and low water, would cause a great wear of the coast; and such is the case, both in the Bay of Fundy and the Basin of Minas. Frosts heave off every year great masses from the trap cliffs of Blomidon, or the shale and sandstone bluffs of the coast of the Basin, and every year sees them more or less completely removed, by the joint action of currents and floating ice. The wear and tear of the softer rocks furnishes a copious fine red mud, which is distributed by the currents over the whole bay.* During the intervals between ebb and flow, when the waters are stationary, this sediment that is deposited forms extensive banks, exposed over large tracts along the shores at low tide. Each tide adds its layer to these banks and sloping shores, sometimes but an exceedingly thin film, at others, especially after stormy weather, amounting to a quarter of an inch or more. The layer formed by a night tide is said to be thicker than that deposited by a day tide. The mud banks, as well as the flat marsh-lands bordering the Basin, especially in Horton and Cornwallis, are composed of this material. Where large tracts had reached such a height as to be covered by only a few feet of water at high tide, the inhabitants, to whom the French Acadians set the example, have dyked them in, and as the "marsh mud" forms a very fertile soil, these dyked lands are very valuable. A little island lay a couple of miles from the southern shore of the bay, between the mouth of the Avon and Cornwallis. Mud accumulated between it and the main land, and as the deposits increased, it at last formed a marsh joining the island to the shore. The French Acadians dyked this in, and the great meadow thus formed was the Grand Pré, where Basil toiled in the forge and paid court to Evangeline.

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*This mud is also borne by the Bay of Fundy current along the coast of Maine even, as we have been informed by fishermen, as far as the mouth of the Kennebec River.—EDITORS.

It is a beautiful day in June: let us pay a visit to the Cornwallis River, near Wolfville. The dyked land here, planted with oats and grass, potatoes, etc., is but a narrow strip bordering the river. We cross it, observing the regularly laid-out ditches used to collect the surface water, and carry it off by sluices through the dykes, which is merely a mud wall a few feet in height, sufficient to keep out the waves at high tide. Outside this wall we find a flat area, in part bare and muddy, partly sedge-covered. Deep gullies are cut in it by the water as it is drained off, and at their bottoms we see immense numbers of coarse black-looking little shells (*Nassa obsoleta* Say) crawling about. We find also a great many specimens of a kind of mussel, with a furrowed shell (*Modiola plicatula* Lamk.), half buried in the mud. Occasionally a clam shell turns up (*Mya arenaria* Linn.), and perhaps a little thin round and flat shell (*Macoma fusca* Say), while a little univalve shell (*Littorina rudis* Mont.) is not uncommonly found attached to the blades of sedge. "Fudge!" says our companion, looking at his but half-visible boots, "we might have chosen a better locality for an excursion than this. Let's go back for a ramble among the hills." "Not so fast, my friend, we've come down here to take a lesson from Nature, and we'll find something interesting by and by." By dint of wading through the mud, leaping across ditches, an exploit rendered somewhat difficult owing to the tenacity of the mud, which makes jumping out of one's boots something easy to accomplish, we reach a sedgy tract, and this crossed, we are by the side of the river. The tide is out, and a scene like that we witnessed on the Avon, at Windsor, meets the eye. The bank slopes rather steeply from its top to the bed of the river. The warm sun has dried and cracked the mud on the surface along the upper edge of the bank, and it is divided into polygonal pieces by a network of cracks, like that of a dried up mud-puddle, and the upper layers are curled up a little so as to be partially separated from those underneath. This cracked and dried part forms a zone running along the whole bank, and extending downwards some distance below high tide mark. In the lower part the bank is always soft. Crack! goes a gun. We look around and see a sportsman not far off, the blue wreath of smoke from his piece fast drifting over the dyke, while an immense flock of "Marsh Peeps" (*Tringa minuta*), is whirling around him, now almost invisible, now flashing up like a cloud of snow-flakes, as they take a different tack, exposing their white breasts. In certain seasons of the year this little bird is very numerous on this shore, together with several other species of waders, and large flocks of them may be seen running busily about over the mud flats, searching for worms, crustaceans, etc.

The baked mud of the upper zone is at present too hard to retain the impressions of their footsteps, while that near the bottom of the slope is too soft. The middle zone, with its smooth, glossy, partially dried surface, is eminently fitted to receive and retain the most delicate impressions, and it is covered all over with the long zig-zag lines of their little three-toed tracks. We distinguish readily the tracks of other species of birds that have run over the same surface. Here is the large three-toed impression of the foot of the Great Blue Heron, which we frightened away when we came up, and which is now wading about leisurely along the edge of a sand-bank in the middle of the river. Here are also tracks of crows and dogs, and here, the deep, brokenly-cut hoof-prints of a cow. There are tracks both of booted and barefooted gunners. See! these impressions were made by a person walking leisurely, but if you will follow them on a little you will find that they begin to be suddenly farther apart, and the toe becomes more deeply impressed. A sportsman has stolen quietly up to a flock of "Peeps," fired, and then run to pick up his game. Here we find great numbers of tracks made by the flock into which he fired; and we see, also, the long grooves made by the shot. There are feathers lying about, and we can tell from the different directions in which he ran, that he has shot and picked up half a dozen birds.

Let us now go up the slope a little further, to where the mud is dry and cracked. On this hardened surface we find the tracks of birds that ran over it a couple of hours ago, when it was still soft. We scale off a few pieces of the upper layer to carry away with us as a specimen, and in doing so discover that there are tracks of the same kind on the next layer underneath. On a previous day the birds ran about over the mud as to-day, leaving the impressions of their feet; these hardened in the sun; the tide came up softly and flowed over them, depositing a new layer of mud upon them, thus preserving them. This layer is pitted with little pear-shaped impressions. "Why! these must be rain prints," suggests our companion, who has begun to be interested in mud-studies, "and the storm must have come from the west too, because the prints are not round but pear-shaped, and from the direction in which the small end of the impression is turned, you can see whence the wind was blowing at the time; besides, the shower could not have lasted long else it would have made the mud too soft, and none of the prints would have been preserved. By the bye, we had a slight shower this morning, just a little while after the tide was full. I'll venture that near high tide mark we shall find some record of it. Yes! here they are, and these, too, are not round, for you remember that there was a smart breeze blowing at the time, and so the drops struck slantingly, making oblong impressions, the smaller ends of which are directed to the point of the compass from which the wind blew." Shells, bones of fish and other animals become buried in these beds, together with the remains of plants, leaves of trees, pine cones, or other fruits; but it is an exceedingly rare thing to find on these flats a dead bird, unless it is one which has been killed by a sportsman.—*Concluded in next number.*